



# DECUS

## PROGRAM LIBRARY

DECUS NO.	8-309
TITLE	PATCHES AND A UTILITY PROGRAM FOR LAB-8
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DECLASSIFIED

## PATCHES AND A UTILITY PROGRAM FOR LAB-8

DECUS Program Library Write-up

DECUS No. 8-309

Patch for the Basic Averager to allow the high-speed punch to dump the ASCII values which are received after a T command in the first section.

### Instructions:

1. LOAD and start the BASIC Averager as usual.
2. Stop it and load the first part of the patch.
3. Restart the program at 6511. The response to the T command will now be punched on the high speed punch (instead of typed).
4. When punching has stopped, read in the second part of the patch and restart at 6621. The program is now unchanged.
5. If more than one average is to be punched, steps 2 through 4 must be followed for each average. The reason for this is that after punching, all TTY output will be on the high speed paper punch. The program must be repatched to avoid this.



## LAB-8

Patch to change the nature of LAB-8 contingency inputs as they are used in the ADVANCED Averager.

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As used in the ADVANCED Averager, Version C, the contents of the contingency inputs are logically ANDed with the sort code. If the result of the AND procedure is equal to the sort code, then the contingency condition is satisfied. Two patches are available which alter the function of the contingency input.

1)	Change Location	From	To
	7412	0172	7000
	7414	1151	1172
2)	6747	6331	7604

Patch 1 effects a direct comparison of the contingency inputs with the sort code. There must be one to one correspondence of the bits for the contingency condition to be satisfied. This facilitates the editing of bad sweeps.

Patch 2 is useful if the LAB-8 does not have Option XR (contingency inputs). This allows the ADVANCED Averager to reference the front switches of the 8/I or 8/L for its contingency reading rather than the standard contingency inputs of the AXØ8. The contents of the switches can be directly compared or ANDed with the sort code depending on the use of Patch 1.

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Patch to omit the calibration mark in Section V display of the  
ADVANCED Averager

Change location	From	To
6662	1321	5274

\*L

/PATCH TO LAB-8 ADVANCED AVERAGER PROGRAM, VERSION C, SECTION 5

/PATCH PROVIDES FOR PUNCHING OF LEADER/TRAILER TAPE WHEN  
/PROGRAM OPTION "T" OF SECTION 5 IS UTILIZED.

/NOTE: WHEN OPTION "P" IS USED, THE WORD "LIFT" IS NOT TYPED  
/WITH THIS PATCH, BUT IS REPLACED BY "+".

LOCATION	CODE	INSTRUCTION
7225	4640	TYPDUN, JMS I CRLFX
7226	4627	JMS I LPTCH1
7227	7570	LPTCH1, PTCH1
7230	3177	DCA SFACTR
7300	4701	JMS I LPTCH2
7301	7553	LPTCH2, PTCH2
7550	0212	LIFT, 0212 /TYPE LINE FEED
7551	0336	0336 /TYPE "+"
7552	0000	0000 /MESSAGE TERMINATOR
7553	0000	PTCH2, 0000
7554	4361	JMS LT
7555	7240	CLA CMA
7556	1012	TAD GETPNT
7557	2353	ISZ PTCH2
7560	5753	JMP I PTCH2
7561	0000	LT, 0 /LEADER-TRAILER
7562	1376	TAD KMLT/ SUBROUTINE
7563	3377	DCA MLT
7564	4665	JMS I TYPEZ
7565	2377	ISZ MLT
7566	5364	JMP --2
7567	5761	JMP I LT
7570	0000	PTCH1, 0
7571	4361	JMS LT
7572	2370	ISZ PTCH1
7573	7344	MTW
7574	1177	TAD SFACTR
7575	5770	JMP I PTCH1
7576	7700	KMLT, 7700
7577	0000	MLT, 0000

\*



## LAB-8 RC CLOCK CALIBRATOR

This program continuously types out the RC clock rate in micro-seconds. Typing CARRIAGE RETURN will halt the program. It can be used as a sub-routine or a stand-alone program. The algorithm is the same as that found in the BASIC Averager. The RC clock is set to the fast mode and the number of crystal clock beats occurring during 100 RC clock beats is equal to the RC clock rate in micro-seconds.

If slower clock rates are desired, the clock can be calibrated in the fast mode and then the additional 3-bit counting chain can be enabled for actual use. The resulting rate will be eight times slower than the calibrated speed.

The program is loaded with the Binary Loader. Starting address = 200.

		*200	
0200	7300	CLA CLL	
0201	6046	TLS	
0202	4327	INIT, JMS CRLF	/TYPE CR LF
0203	1344	TAD M10	/SET LINE COUNTER
0204	3343	DCA COUNT	
0205	3341	LOOP, DCA ARITH1	
0206	3342	DCA ARITH2	/CLEAR WORKING AREA
0207	6346	6346	/ZTEN OTEN
0210	6356	6356	/CLXK CLRK
0211	7326	7326	/MAKE AC 2
0212	6321	6321	/SKXK
0213	5212	JMP .-1	/SNYC CLOCK
0214	6346	6346	/ZTEN OTEN SET AX08
0215	6352	6352	/CLXK
0216	1346	TAD M144	/GET -100 OCTAL
0217	6354	TLOOP, 6354	/CLRK
0220	6321	6321	/SKS/XK
0221	5224	JMP .+3	
0222	6352	6352	/CLXK
0223	2342	ISZ ARITH2	/COUNT A XTAL TICK
0224	5226	JMP .+2	
0225	2341	ISZ ARITH1	/ACCOUNT FOR OVERFLO
0226	6341	6341	/SKRK
0227	5220	JMP TLOOP+1	
0230	7001	IAC	/COUNT AN RC TICK
0231	7440	SZA	/100 COUNTED YET
0232	5217	JMP TLOOP	/NO CONTINUE
0233	6346	6346	/YES, ZTEN OTEN
0234	3347	TYPE, DCA TEMP	/CLEAR DEFLATE COUNTER
0235	1337	TAD RAD11	/GET LOCATION OF HI ORDER DEFLATOR
0236	3335	DCA RAD1	
0237	1340	TAD RAD12	/LOCATION OF LO ORDER DEFLATOR
0240	3336	DCA RAD2	
0241	7300	AGAIN, CLA CLL	/CLEAR AC AND LINK
0242	1342	TAD ARITH2	/GET LO ORDER
0243	1736	TAD I RAD2	/DEFLATE
0244	3342	DCA ARITH2	/SAVE RESULTS
0245	7004	RAL	/NOTE DISPOSITION OF LINK
0246	1341	TAD ARITH1	/GET HI ORDER
0247	1735	TAD I RAD1	/DEFLATE
0250	7510	SPA	/GONE TOO FAR?
0251	5255	JMP NEG	/YES CORRECT DEFLATEE
0252	2347	ISZ TEMP	/NO, NOTE DEFLATION AND GO ON
0253	3341	DCA ARITH1	/SAVE HI ORDER
0254	5241	JMP AGAIN	
0255	3341	NEG, DCA ARITH1	
0256	1736	TAD I RAD2	/GET LO ORDER DEFLATOR
0257	7041	CMA IAC	/NEGATE IT
0260	7100	CLL	
0261	1342	TAD ARITH2	/ADD OVER DEFLATED LO ORDER
0262	3342	DCA ARITH2	/IT IS NOW RESTORED
0263	7004	RAL	/SAVE ANY CARRIES



0264	7041	CMA IAC	/NEGATE THE CARRY
0265	1735	TAD I RAD1	/GET HI ORDER DEFLATOR
0266	7040	CMA	/FORM 1'S COMPLEMENT OF IT
0267	1341	TAD ARITH1	/ADD HI ORDER
0270	3341	DCA ARITH1	/DOUBLE PRECISION NUMBER RESTORED
0271	1347	TAD TEMP	/HOW MANY TIMES DID WE DEFLATE
0272	1351	TAD K260	/MAKE IT ASCII
0273	4321	JMS TYP A	/TYPE IT
0274	3347	DCA TEMP	/CLEAR TEMP
0275	2335	ISZ RAD1	
0276	2335	ISZ RAD1	/MOVE RADIX POINTERS UP
0277	2336	ISZ RAD2	
0300	2336	ISZ RAD2	
0301	1736	TAD I RAD2	/ARE WE DONE DEFLATING YET
0302	7640	SZA CLA	
0303	5241	JMP AGAIN	/NO. DEFLATE WITH NEXT RADIX
0304	1350	TAD K240	/YES. TYPE SPACE
0305	4321	JMS TYP A	
0306	6031	KSF	/ANY KEYBOARD COMMANDS?
0307	5316	JMP ON	/NO
0310	6036	KRB	/YES. READ IT
0311	1345	TAD M215	/CHECK FOR CR
0312	7640	SZA CLA	
0313	5316	JMP ON	/NOT A CR. IGNORE
0314	4327	JMS CRLF	/CR. TYPE CR LF
0315	7402	HLT	
0316	2343	ON, ISZ COUNT	/SHOULD WE START ANOTHER LINE?
0317	5205	JMP LOOP	/NO THERE IS STILL ROOM
0320	5202	JMP INIT	/YES. THIS ONE IS FILLED UP
0321	0000	TYP A, 0	/SUBROUTINE TO TYPE AC
0322	6041	TSF	
0323	5322	JMP .-1	
0324	6046	TLS	
0325	7200	CLA	
0326	5721	JMP I TYP A	
0327	0000	CRLF, 0	
0330	1371	TAD K15	
0331	4321	JMS TYP A	
0332	1372	TAD K212	
0333	4321	JMS TYP A	
0334	5727	JMP I CRLF	
0335	0000	RAD1, 0	
0336	0000	RAD2, 0	
0337	0353	RAD11, RD1	
0340	0354	RAD12, RD2	
0341	0000	ARITH1, 0	
0342	0000	ARITH2, 0	
0343	0000	COUNT, 0	
0344	7770	M10, -10	
0345	7563	M215, -215	
0346	7634	M144, -144	
0347	0000	TEMP, 0	
0350	0240	K240, 240	
0351	0260	K260, 260	
0352	0000	FIRST, 0	



0353	7747	RD1, 7747	/-100,000 (HI ORDER)
0354	4540	RD2, 4540	/LO ORDER
0355	7775	7775	/-10,000 (HI ORDER)
0356	4360	4360	/LO ORDER
0357	7777	7777	/HI ORDER
0360	6030	6030	/-1,000 (LO ORDER)
0361	7777	7777	/-100 (HI ORDER)
0362	7634	7634	/LO ORDER
0363	7777	7777	/-10 (HI ORDER)
0364	7766	7766	/LO ORDER
0365	7777	7777	/-1 (HI ORDER)
0366	7777	7777	/LO ORDER
0367	0000	0	
0370	0000	0	/END OF LIST
0371	0215	K15, 215	
0372	0212	K212, 212	

AGAIN 0241  
 ARITH1 0341  
 ARITH2 0342  
 COUNT 0343  
 CRLF 0327  
 FIRST 0352  
 INIT 0202  
 K15 0371  
 K212 0372  
 K240 0350  
 K260 0351  
 LOOP 0205  
 M10 0344  
 M144 0346  
 M215 0345  
 NEG 0255  
 ON 0316  
 RAD11 0337  
 RAD12 0340  
 RAD1 0335  
 RAD2 0336  
 RD1 0353  
 RD2 0354  
 TEMP 0347  
 TLOOP 0217  
 TYP A 0321  
 TYPE 0234

ADVANCED AVERAGER SECTION III PATCH  
FOR HIGH/LOW SPEED PUNCH  
OF ACCUMULATED AVERAGES



Patch to allow Section III of the ADVANCED Averager to reside in core, dump averaged data, and live to average again.

This patch is in RIM format. It is loaded by the RIM loader into the area of core normally occupied by the BIN loader. It can be entered any number of times.

To use:

1. Run through Sections I and II as usual.
2. Load Section III and press CONTINUE.
3. Press STOP.
4. Load patch in with RIM Loader 7756 in SR, LOAD ADDRESS, START.
5. Press STOP.
6. Restart Section III at location 6530 .
7. Average as normal.
8. When average is complete and dump is desired, hit CTRL/P.
9. Program will halt.
10. Set the number of the averages to be dumped in the SR.  
SR(11) for AVG#1  
SR(10) for AVG#2  
etc...  
  
(They will be dumped in order of numerical priority.)
11. Press CONTINUE.
12. Again the program halts.
13. Turn on the low speed punch.
14. Press CONTINUE.
15. The dump will now proceed.
16. Program halts at the end of the dump of one average.
17. Turn off punch. Add any spacer tape desired manually.
18. Press START

19. Patch checks for more dumps. If found, it returns to the halt at instruction 12. Otherwise, it proceeds to the start of Section III and sets up for another average.

NOTES ON FORMAT:

The data is stored in core in double precision, lo-order first. Negative values are in two's complement.

The dump will be in Binary Format. Two rows of punched paper tape equal one 12-bit word (6 bits to a row). The first row is the left-most 6 bits, the second row is the right-most.

The first two rows of dump are the number of the average that is being dumped. The next two rows contain minus the number of points. Next two rows contain the number of sweeps in the average. Following this is the data. The data represents the SUM of the sweeps. It must be divided by the number of sweeps to get the average.

Dump is good for averages only. i.e. confidence limits or trend must not be present.



7600	6002		*7600
7601	6346		IOF
7602	7602		6346
7603	3310		HLT CLA /PAUSE:SET SR AND CLEAR AC
7604	7100		DCA NUMB /SET COUNTER TO ZERO
7605	7604		CLL
7606	7010	MORE,	LAS /READ THEM
7607	7430		RAR /WHICH JOB?
7610	5215		SZL /THIS ONE?
7611	2310		JMP SETUP /YES
7612	7440		ISZ NUMB /NO
7613	5206		SZA /ARE THERE ANY MORE?
7614	5717		JMP MORE /GO BACK RETRY
7615	3311	SETUP,	JMP I START /NO MORE: RETURN TO AVGER
7616	1310		DCA WHICH /SAVE AVG INDICATOR
7617	7140		TAD NUMB
7620	3312		CMA CLL
7621	1313		DCA MNUM /IS COMP OF JOB
7622	1314		TAD K223
7623	2312		TAD K007
7624	5222		ISZ MNUM
7625	3316		JMP .-2
7626	1716		DCA LOC /AC CONT DAT LOC
7627	3307		TAD I LOC /- POINTS
7630	1315		DCA MPOINT
7631	1316		TAD K002 /MOVE IN J LIST
7632	3316		TAD LOC
7633	1716		DCA LOC
7634	3010		TAD I LOC
7635	4240		DCA IO /AUTO INDEX XR
7636	1311		JMS DUMP
7637	5206		TAD WHICH
7640	0000	DUMP,	JMP MORE
7641	6046		O /DUMP ROUTINE
7642	7602		TLS /OR PCF: CLEAR TTY FLAG
7643	2310		HLT CLA /TURN ON PUNCH
7644	1310		ISZ NUMB /MAKE NUMB = AVG BEING DUMPED
7645	4263		TAD NUMB /BRING IT TO THE AC
7646	1307		JMS PUNCH /PUNCH IT OUT
7647	4263		TAD MPOINT
7650	1410		JMS PUNCH /- POINTS
7651	4263		TAD I 10
7652	1307		JMS PUNCH /NUMB OF SWEEPS
7653	7004		TAD MPOINT
7654	3307		RAL /PTS X 2= WORDS
7655	1410	LOOP,	DCA MPOINT
7656	4263		TAD I 10
7657	2307		JMS PUNCH
7660	5255		ISZ MPOINT
7661	7402		JMP LOOP
7662	5540		HLT /TURN OFF PUNCH
			JMP I DUMP

```

/
/
7663 0000 PUNCH, 0 /POCH NUM IN AC
7664 3306 DCA TEMP
7665 1306 TAD TEMP
7666 7012 RTR;
7667 7012 RTR;
7670 7012 RTR
7671 0305 AND MASK
7672 6041 TSF /PSF FOR HI SPEED PUNCH
7673 5272 JMP --1
7674 6046 TLS /PLS FOR HI SPEED PUNCH
7675 7300 CLA CLL
7676 1306 TAD TEMP
7677 0305 AND MASK
7700 6041 TSF /PSF FOR HI SPEED PUNCH
7701 5300 JMP --1
7702 6046 TLS /PLS FOR HI SPEED PUNCH
7703 7300 CLA CLL
7704 5663 JMP I PUNCH
7705 0077 MASK, 0077
7706 0000 TEMP, 0
7707 0000 MPOINT, 0
7710 0000 NUMB, 0
7711 0000 WHICH, 0
7712 0000 MNUM, 0
7713 0223 K223, 223
7714 0007 K007, 007
7715 0002 K002, 002
7716 0000 LOC, 0
7717 6530 START, 6530
*6564

6564 7600 7600

```

```

DUMP 7640
K002 7715
K007 7714
K223 7713
LOC 7716
LOOP 7655
MASK 7705
MNUM 7712
MORE 7606
MPOINT 7707
NUMB 7710
PUNCH 7663
SETUP 7615
START 7717
TEMP 7706
WHICH 7711

```



OVERLAY FOR SECTION 3  
OF DEC-LB-U17C-PB

An overlay for Section 3 of DEC-LB-U17C-PB (second section of U18B-PB), the LAB-8 Averager Program is enclosed. The overlay allows the user to output information on an X-Y analog recorder without going through the process of reading in Sections 4 and 5 of the LAB-8 Averager Program Tape. In contrast to Section 5 of the LAB-8 Averager Program Tape, the overlay Does Not:

1. Include a routine for calibrating the X-Y Recorder ("Gain...", "Bias...", etc.).
2. Offer a variable plotting rate. That is, the plot rate is a function of the clock rate; regardless of the distance between two successive points.
3. Include a routine for drawing borders and axes (grids) on the X-Y Recorder paper.
4. Inform the user when to lift and lower the pen on the recorder and consequently does not provide the user with an indication that the computer is "waiting" for him to type LINE FEED.

## DEC-LB-U17C-D

### 1. Abstract

An overlay to Section 3 of DEC-LB-U17C-PB (second section of U18B-PB), the LAB-8 Averager Program, to run an XY Analog Recorder.

### 2. Requirements

XY recorder should be connected in parallel with the LAB-8 oscilloscope. Analog output will vary between 0 and -10 volts.

AX-08

PDP-8/I

Oscilloscope

### 3. Loading

With the online averaging program (U17B or U18B) in core and an average completed, turn the reader to "STOP" or "FREE" and position overlay binary tape (U19B-PB) in reader. Bit 0 of the switch register should be up to use the ASR-33, down to use the PC-8I. Strike <CTRL> P and turn reader to START. When tape stops, verify that accumulator lights show 0 (all off). (If they do not, reposition tape and press CONT on console.) Then, turn reader to "STOP" and press CONT.

### 4. Usage

1. Note the position of the RANGE switch of the TIMING CONTROL, and then set it full clockwise.



2. The program waits for the user to lift the pen and strike LINE FEED.
3. The pen is moved to the left margin and the program waits for the user to lower the pen and strike LINE FEED.
4. The first average is then plotted at a rate determined by the RANGE switch of the timing control. Adjust the coarse control until the desired plot rate is attained.
5. When the average has been plotted, the program waits for the user to lift the pen and strike LINE FEED.
6. The pen is then moved to the left margin and the program waits for the user to lower the pen and strike LINE FEED.
7. This is repeated for each average to be plotted.
8. When all averages have been plotted, strike <CTRL> P.
9. Reset the RANGE control to its position at the start of this program.
10. Turn the reader to "START."
11. The averaging program is then restored. When the tape stops, verify that accumulator shows 0.
12. Turn the reader to "STOP" or "FREE."
13. Press CONT on the console.
14. <CTRL>R or <CTRL>Z will reinitialize for more averaging.

